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LIVING LIGHT, by E. N. Harvey

Reviewed by B. L. Whorf

Man, says Dr. Harvey, is so fundamentally diurnal in habit that he is seldom aware of the universal occurrence of faint luminescences, light emissions with no heat, produced under the most unexpected circumstances. A leading authority on the subject, Harvey explores the whole field of "cold light" and especially the emission of light by living animal and vegetable species, and discloses a fascinating frontier of strange phenomena.

A world without sun or fire would still not be a dark world, but a world of faint lights, in which creatures with sensitive eyes, like those of the denizens of ocean depths, would be able to see. Outdoors in the country on a snowy moonless night with stars hidden under dense clouds, one moves not in pitchy blackness, but in a dimly phosphorescent world. One gains the impression of faint light leaking everywhere through matter from the more subtle layer of electronic activity within it, activity which has often been adapted by evolving life-forms to biological ends.

Luminosity has been observed in rain, snow, fog, in sweat and urine, and about flowers and other living things not biologically luminescent. The reviewer, and students familiar with occult or parapsychic investigations may wonder if observers with a trace of etheric sight (which need not be extra-sensory, but perhaps a visual sensitivity like that of deep-sea creatures) may not have seen many of these appearances, and might not with training see a wider range of luminous emissions from ordinary objects.

Luminous organs are eyes in reverse. The two are anatomically and physiologically similar; the evolutionary process has molded organs for utilizing light in the same fashion whether they be for producing or responding to the light. Structures occurring in eyes, such as the lens, are usually fluorescent, and retinas are potential sources of cold light.

Luminosity is spread throughout the animal kingdom, i.e. it occurs in all the important phyla, though in the Chordata going no higher than the fishes, where however it is amazingly developed. But in the vegetable kingdom it is confined to the bacteria and fungi, i.e. to those lowliest forms which are nearest to the primitive base from which both kingdoms in their present specialized form have branched off. This is striking testimony to the basic unity of life; it suggests that luminosity is the precursor of sight, remaining rudimentary in the kingdom that did not develop sight. The relation of the development of consciousness to light, and even perhaps a basic unity of light and consciousness, light as a grade of consciousness in the cosmos, will be suggested to the philosophically minded. The "subjective" light, or sense of light, sometimes "seen" in or after meditation, when consciousness is deliberately intensified, indicates from another angle the connection of light and light-sense with consciousness.

Luminosity in animals is often closely connected with sex and mating - life manifesting as the maintenance and evolution of the species.

In the Bermuda worms, which live in coral at the bottom, mating and luminescence show a lunar periodicity. The second, third, and fourth nights after full moon, 55 minutes after sunset, regardless of weather, the worms come to the surface, becoming luminous, and the sexes swim toward each other and rotate together scattering eggs and sperm, and exude a luminous halo in the water.

Luminescence in fish is sometimes controlled by hormones; in some cases the entire fish can be made to glow by an injection of adrenalin. This is especially interesting in view of the location of the hormone glands in man in exactly the same places in which clairvoyants and ancient Indian science describe luminous etheric organs, having the general wheel-like shape of eyes or light organs, the celebrated chakrams.

The author cautiously avoids the facile functional explanations formerly common, and points out that the use of the light to the organism is often problematical. Yet he makes it clear that luminescence and light organs are intelligible "historically", as it were, as perfected by long evolution from a primitive basis in which light-emission is tied into the structure of matter itself. Such commendable caution, emphasizing that more study is needed to understand the function or value to the organism of the phenomenon, seems to be superseding in modern biology an older method that apparently considered functions to be self-evident or even implied that they were data of observation, by means of which evolution could be "explained".

Harvey shows that living luminescence must be understood in terms of cold-light emission in general, and one chapter is a notable sketch of all that is known on this subject. Light is emitted always from energy-changes of sub-atomic particles (electrons, etc.). There are many ways in which atoms may be excited so that their electrons emit cold light. Even sound waves passing through a liquid produce light if they are intense enough. Crystals often emit light when they are formed (crystallo-luminescence) and when they are broken up, by solution (lyoluminescence) or by crushing (triboluminescence). Stability of light-emissions after the exciting cause is removed seems bound up with a structural lattice state of solidity, crystalline or colloidal, for if fluorescent dye solutions are frozen or gelatinized the light emissions becomes stable and the fluorescence is converted into a phosphorescence. Minerals, such as the luminous sulphides, often require special methods of preparation or traces of essential impurities, in order to luminesce. Here we see already a faint similarity to life, in that a total complex, in which microscopic parts may be of great importance, determines the properties.

Of all the modes of cold-light production, biological organisms use only one, chemiluminescence or luminescence due to chemical reaction, and in their case also special chemicals are used, of an enzyme-like nature, which are specific for the biological species, race, or strain. This points to the co-evolution of luminant chemicals, light organs, behavior with light organs, and the species themselves (and we might add, eyes, sight, and consciousness) as associate components of the whole stream of organic evolution. In the egg and embryo the evolutionary precursor-stage of unspecialized luminosity may appear. The whole egg of a firefly is luminous, not from any material of the adult luminous organ adhering to it, but from within the ovarian egg itself.

Speaking in general terms, biological organisms do not shine unless they are alive. The light from dead fish is emitted by living bacteria. Dead things do not radiate light, unless they contain stable luminous chemicals that may be preserved by a suitable process, as by drying. Harvey says that "light appears to be linked with life" and that "the living world is weighted at the very bottom with light-producing forms". Yet bioluminescence is not a vital process, in the sense that a nerve impulse is; luminous cells still luminesce after maceration. Harvey points out that what the older terminology calls "living protoplasm" is not necessary to the light production. We might call it a "sub-cellular" activity.

The material which Harvey presents seems to this reviewer to suggest strongly the fruitfulness of a wider conception of life and living phenomena than the traditional biological one. By using the theosophical concept of life it would seem possible to reduce all the occurrences of cold light to a simple rule: where luminescence depends on aggregates larger than atoms, these aggregates are parts of living forms (in the theosophical sense). This includes crystals and other lattices, including some of the preserved parts of the dead physical bodies of animal and plant organisms. It would be interesting to find out if the statement could be further simplified to: stable luminous systems larger than an atom have sub-etheric bodies.

The book is richly documented with a very extensive bibliography and beautifully illustrated, though one might wish that the plates had been distributed through the text instead of confined to the back. The style is good and readable, and the presentation is confined to factual material. Most of the evolutionary interpretations in this review are the reviewer's and not the author's.

LIVING LIGHT E. N. Harvey. Princeton University Press, Princeton, N. J.
1940. 223 pp. bibliography 50 plates.

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In a book just published (This Amazing Planet) Roy Chapman Andrews has collected interesting instances of life, enrichment for our imaginations concerning the variety and intensity that marks all living together (symbiosis), not only of the kingdoms of nature, but also of life and energy. He discusses vision in animals. All mammals except monkeys are color-blind, but they detect intensities of light with great delicacy of judgment. Birds, fishes and insects are supposed to possess color sense. (The chemical and photographic mastery of color has advanced very far indeed in recent years, but knowledge of the physiology of color vision goes more slowly. The theory of Ladd-Franklin still retains interest. It is that sight was originally of white-black, or light-darkness---everything is judged in terms of grey. The second step was the addition of blue and yellow. Finally red and green were added. This suits the statistics about color blindness in man. But it is inadequate for what is known about sight in the animal kingdom).

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A fascinating theme was broached by Dr. William J. Robbins of the New York Botanical Gardens out of the well established fact that the haemin part of red blood corpuscles (haemoglobin) is the same as chlorophyl except that the former has an iron atom where the chlorophyl has a magnesium atom. (The displacement of this one atom by another makes a greater oxygen efficiency for man, and hence the breathing surface may be infolded and internal. While still a very large area, the lung surface is relatively much less than leaf surface, and needs no such free air movement over it.) Dr. Robbins points out that if we were green (with chloroplastid elements, not jealousy) instead of pinky white, we could make part of the food we need directly by sun-bathing. He then expands this delightful notion (as reported by John J. O'Neill in Herald Tribune 27/10/40) as follows:

"But the total area of the body is not more than one to two square yards, and if we were as efficient in making sugar from carbon dioxide and water as the green leaf is, we would need to expose from 80 to 100 square yards to the light.

"It is quite clear that to attain this ideal, modifications in our body structure permitting the exposure of a greater area would be necessary. For example, we might have our ears enlarged to structures eight or nine yards in diameter or our lips extruded into a semi-circle ten or twelve yards in diameter, which would stick up into the air and orient itself suitably to catch the light, or have fingers thirty feet long and webbed with thin, green tissue.

"Such thin, extended surfaces would require support of some sort, say ribs of cartilage, and would bring various complications. The greater loss of water from such extended areas would require us to drink more. A few minutes, exposure to cold weather would freeze such tissue and windy days even though the breeze were mild, would be a source of considerable difficulty because of the sail-like character of the tissues exposed. By breaking up the tissues into small units a few inches square, and having each hinged upon a support, wind resistance could be reduced. We would need between 16,000 and 20,000 such units, say three inches square.

"Even under such circumstances some kind of anchorage would be necessary if we were not to be blown over by every passing breeze. Anchorage means that movements would be circumscribed; we would have to stay in one place and to avoid the freezing in cold weather it would be necessary to drop our photosynthetic area in the winter and hibernate.

"In fact, if man were to develop chlorophyll and make his own food, he would have to become a tree," concluded Dr. Robbins.

(I think that I shall never see a man become a lovely tree.
A tree more hungry than the rest for mind and soul, at Nature's breast
Might come to be a chimpanzee; and then, one jump---and he'd be me !)
F.K.

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The primitive streak in the embryo can be seen in the germinal spot of the hen's egg early in the first incubating day. It occurs also in the mammalian ovum. Dr. G. L. Street of the Carnegie Institution communicated to the National Academy of Sciences at Philadelphia October 28th (NY Times 29/10/40) that this streak consists of master tissue which controls the foetal process until the final formation of the body in all its parts, without itself losing its identity. In the monkey it continues until the tip of the tail is formed. In humanity it carries on similarly until the coccyx is complete. The role of the primitive streak has thus been enlarged from that of forming the mesoderm (between endoderm and ectoderm) of the embryo to that of providing the reservoir for the whole process. There is just exactly enough to complete the creature's typical form. It consists of unspecialised cells in "direct lineal descent from the totipotent substance of the original fertilized ovum".

There is a saying, All good things are three, rooted back not only into Christian or other trinitarianism, but into folk experience. Fundamental life processes are so often three in one, four all told. In this group the middle (mesoderm in this case) reflects the whole, is totipotent.

And at the same meeting of the National Academy Dr. W. S. Eifitz, University of Pennsylvania, showed with motion pictures that living tissues have one fundamental and three subordinate rhythms. They are said to be due to the expansion and contraction of large folding molecules. (Herald Tribune 29/10/40)

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As living creatures all display psychic activity it follows that all biology (except possibly anatomy in the strictest sense) requires constant concern with psychology. It is difficult to separate explicit information about the psychic aspect, each new biological fact brings up special and new problems in this domain. The preceding pages, for instance, discuss such aspects of the subject as life and light and life and time. The time-binding or time-trafficking powers of living creatures is a matter of common observation. The modern mind assents to the notion that the world of the psyche (whatever else it may be) must be associated in some definite manner with the radiant state: Chlorophyll is enough to settle this point. Again, time is a dimension and all electromagnetic phenomena exploiting that dimension bring time and the radiant state forward as aspects of some new energy level in which biological process proceeds. In short, the grand ether spectrum of approximately sixty octaves from where audio frequency leaves off to the point where inter-galactic types of energy take up has the closest association with vitality. Such solar radiation as reaches the earth occurs almost exactly in the center of this grand spectrum. We might provisionally regard vital process as gross or somatic, on one side, and vital and etheric on the other. The former occurs in the familiar stable realm of solids, liquids and gases. The latter goes on according to laws obscure as yet in the ether spectrum. From the visible light spectrum all along to the end, but principally in a practical way with X-rays, are radiations which alter the mutation process in both dormant seeds and bulbs and are active in dividing pollen and egg cells and in ova, so that new generations can be provided with stable new variations. The Regal Lily developed by Dr. C. P. Haskins at the General Electric Laboratories, the new Lord Selkirk Gladiolus of Jerry Twomey, Jr., the fruit fly variation by Morgan and much else show us that whatever radiant energy is in itself it constitutes also certainly the range in whose very heart is the vital process, the prana of Indian thinkers.

But what are we to think of emotions as exciting causes for tissue changes? There are two aspects to this. One is the changes in nerve-current potential, resulting in measurable action-current in attached electrical circuits. What the exciting nerve current is, is not known. But even if it proves to be a measurable wave of length and frequency, we have still to explain functional and glandular disturbances. Dr. Bela Mittelman and Dr. Harold G. Wolff at Cornell (Herald Tribune, 27/10/40) have just added the latest weight to the evidence that emotions are beneficent or destructive. Nineteen stomach ulcer patients were studied and the onset of the disorder found associated with such stress as threats to support, success, esteem. Anger, anxiety, resentment and guilt produce (by whatever means it may be) increased secretions of hydrochloric acid and accelerated intestinal response. Emotions work nerve currents which work organs. What are emotions in themselves? The rule of economy in Nature and of thought requires us to hold in mind the concept of energy levels, perhaps of quite new orders, beyond nerve-energy level, and which are sources of control for nerve energies.

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Following the earlier work of Dr. Waller and others, interesting new material on body-mind, by Dr. L. F. Beck at the University of Oregon has been reported by the Associated Press. (7/10/40) We condense the report.

"There is natural resistance to the flow of electricity in the skin. Shock and strong emotions affect this resistance. It is shown by the Oregon experiments, fixed beliefs also affect the skin resistance. Fear or suspense are well known causes of drop in the electrical resistance.

"To study this the Oregon psychologist used slight electric shocks, which caused the usual drops. Along with each shock a light flashed simultaneously.

"After 20 or 30 shocks, accompanied by the flash, the light alone was enough to cause the skin resistance to drop. It was the same for men and women. They were unable to resist the skin decrease at the flash of light. Neither could they, by will power, lower their skin resistance.

"The electrical change cannot be felt and is detected only with instruments.

"The electric shock and the simultaneous flashing light tests were duplicated upon hypnotized persons. The skin changes were the same.

"Then a new factor was introduced. With no electric shock, and no light, the hypnotized persons were told that a light flashed. Their skin resistance dropped just the same as when there was a real light. The hypnotized persons, like those 'awake' were unable to control the skin changes.

"Next the hypnotized persons were told they were blind, and here the evidence of the effect of fixed beliefs came in strongly. Being told that they were blind was sufficient to stop the skin resistance drop in most, but not all cases.

"The exceptions, whose resistance continued to fall, brought out a significant fact. Three-quarters of those who refused to become 'blind' under hypnotism had been worried about their eyesight. A few of them even woke up from hypnotism when blindness was suggested.

"The experiments show the existence of an involuntary mechanism at work between the mind and the skin's electrical properties. If a way can be found to control this mechanism, it may provide a clue to restoring the health of persons whose physical ills are caused by their mental states."

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Dr. George Crile of Cleveland spoke of the brain-thyroid linkage as giving developed man superiority over the wild man within him who works through the brain-adrenal linkage, at a meeting of the American Council on Education and Progressive Education in New York (NY Times 2/11/40). This can be done by educational emphasis, heightening the reason with the better emotions, at the expense of the more unreasoning passionate emotions. (Every mention of this educational problem raises the issue: when is the independent reality of the psyche likely to be admitted and its laws studied in themselves, above the glandular-neural level, so that an educational method can be worked out to this much-desired end ?)

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"The director of the American Psychical Institute discusses the revision of psychology which must take place if psychic phenomena really exist. The author holds that there is nothing supernatural in telepathy, clairvoyance, apparitions, mediumistic manifestations, but that their evidence should be classed in the present state of our knowledge as 'supernormal.' The psychic investigator is urged to keep in mind two general maxims: 1, all is possible; 2, the strength of the evidence should be proportioned to the strangeness of the facts.

"Mr. Carrington maintains that a whole new system of philosophy and psychology will have to be built up, based upon the 'facts' of super-normal activities, and 'psychical research will thus become the most influential and important of all human activities.'

(The foregoing is from a notice of a new book by Hereward Carrington, Psychology in the Light of Psychic Phenomena, McKay, Philadelphia, 214 pp. \$2.00 Herald Tribune 20/10/40)

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Is There a Physical Basis for Race Superiority ? by Wilton Marion Krogman, Associate Professor of Anatomy and Physical Anthropology. The University of Chicago noticed in Scientific Monthly, November, 1940.

Krogman in this book discusses race differences from all angles and compares man as to color of skin and hair, cephalic index, glandular condition, and disease susceptibility. He defines race in one sense as identical with the general biological concept of a "breed", social characteristics are therefore "certain physical traits that are within each group, predetermined by heredity and in which all members of the group participate."

He inquires as to "origin of race types, whether cast in one mold or several" can be answered only in part. "The evolution of animal forms is written in terms of two factors: isolation and corollary, inbreeding.....These factors are certainly non-operative in the evolution of present-day human physical types.....We can therefore, explain intermediate physical types as hybrids, resulting from race mixture. But how may we explain our basic types ?"

In asking the question, "are there inferior and superior races ?" Krogman says there are two main approaches to this problem: "the anatomical and the cultural." In comparing the white and black (because they predominate in this country) as regards the brain, he says, "It seems to me that the whole problem of the normal brain narrows down to this issue: not so much what is there but how it is used."

Krogman says that the whole question of character "rests on two very naive assumptions: first that if the civilization is high, the aptitude for social development is correspondingly high; secondly, that a race is lower in the scale the more it differs from the White civilization, which quite illogically is used as a basis for comparison. There is an utter disregard of the primary factors in the development of a civilization: time, events and contact."

He concludes with: "My answer must be that there are observable and measurable quantitative racial differences both as to physical and cultural development; but there are no measurable physical or social qualities which are in any given group superior or inferior."

(Digest by Richard Schooley)

(Knowledge of blood groups may presently expand enough to provide more exact knowledge of race-ancestry. We have advanced a little beyond Karl Landsteiner's four types, and few attempts have been made to equate these to race. The war might have added to information, but the technique of the blood bank today is to use mostly the plasma half alone, the plasma appears to be without type-features. Cephalic index is a crude measurement as to psychic predispositions composed with blood chemistry. And race is psychiospiritual as well as organic and somatic).

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WE MAY END THE WAR THAT IS WITHIN ALL WARS THAT ARE WAGED TO END ALL WAR.....

These books, (see below), are outstanding examples of a type of investigation that is gradually unsettling the old-style materialistic theory of economics. And since both Marxian communism and private capitalism are based on a stereotyped materialistic formulation of economics, such irrefutable scientific expositions of the fact that economic behavior is conditioned by culture, not by mechanistic reactions, may be the forerunners of a new era. A political economy based on the theory of an essential struggle for material goods = The "law of the jungle" in private industry, in nationalistic imperialism stems largely from, a definite intellectual theory of human behavior, at one time considered scientific. This is the theory of materialistic classical

economics - materialistic in its outlook but tenuously abstract in its logic. It assumed somewhere in the empyrean a baker's dozen or so of pearl-white pushbuttons marked "capital", "labor", "supply", "demand" etc. on which could be played all possible economic tunes.

The discovery that the economic situations in any culture are determined by a complex system of intangibles is of course no new thing to cultural anthropology - but it has not yet become a part of our accepted thought. These two books are significant centers of such infiltration. Dr. Richards's is a competent, tightly-knit study of food economics in one society, the Bemba of South Africa, with a constant relevance to larger issues. Professor Herskovits's book is a general approach, to the analysis of economic activity outside our own culture. In the words of the reviewer, "the result is a distinct contribution to the type of economic generalization toward which institutional economists have been half-consciously groping - - - one of those rare works which is required reading for all social scientists!"

B. L. Whorf

The foregoing is based upon two reviews in "AMERICAN ANTHROPOLOGIST" Issue of Oct.-Dec., 1940,

"Land, Labour and Diet in Northern Rhodesia", Audrey I. Richards, Oxford University Press, 1939. Reviewed by Melville J. Herskovits.

"The Economic Life of Primitive Peoples", Melville J. Herskovits, Alfred A. Knopf, New York, 1940. Reviewed by Lloyd G. Reynolds.

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The Telescope (Harvard Observatory) in its current issue carries Dr. E. C. Slipher's report on the new photographs of Mars taken from Lamont-Hussey Observatory in South Africa last year. The photographs provide incontestable evidence of surface changes, clouds, polar cap congealed mists of ice or snow. There is no question whatever that both Schiaparelli and Lowell saw and drew correctly, and the matter is no longer in doubt (that there are canals and vegetation areas) simply because others did not see as clearly.

In the Smithsonian Institution annual report appearing in October, the astronomer royal of Britain (Harold Spencer Jones) reported that primitive vegetable life is perfectly possible on Venus. One mystery is that though there are always heavy clouds the spectroscope shows no water vapor. Carbon dioxide is abundant in the atmosphere above the clouds. Concerning Mars, Dr. Jones is quite as favorable in his view to the sustaining of life, although because of vast temperature changes he regards it as a planet of nearly spent life.

Dr. Jones points out in his new book, *Life On Other Worlds*, that there are some hundred million separate universes, computed at present.

One must surely suppose that in these universes there must be vast numbers of planets supporting organised life in all sorts of forms, and the notion that we are the only humanity becomes simply ridiculous. The astronomer verifies the uniformity of the world stuff, and the uniformity throughout space, of the physical laws. In fact it is from the properties of space-time that it all arises. We have either to show that earth is the sole exception to these laws (which is an idiotic notion on its face)---or else we must declare that the uniformity goes on wherever it appears. The real difficulty is that the concept of order means dependability to the physicist, and to the biologist it means in addition symmetry and the like. If the universe is basically alive, then the uniform biological laws---and the psychological laws as well---permeate the whole cosmos.

The editor of the London Economist writes in the N.Y. Times, 20/10/40 of the challenge to total re-organization which must not pass away after the war crisis has been met. He concludes that a guarantee of social and economic rights to the citizen must be forth-coming and proposes that a "Bill of Political Rights should be supplemented by a Bill of Economic Rights, so that the democracies could proclaim to the whole world, 'These are the unequalled advantages of citizenship in a democracy'," and he ends by stressing the fact that if "an extended Bill of Minimum Rights were coupled with a Bill of Minimum Duties, the State and the citizen would have put their relations on a sound and solid basis of reciprocal benefit. Democracy would have set up its charter for the twentieth century: security without slavery, freedom without poverty, progress without violence."

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Harold J. Laski points out that isolationism is appeasement; that the blitzkrieg stage is past and the economic pressure stage of the war is on; that facing up to France and Petain is just as important as was re-opening the Burma road; that the issue of the democracies against the dictatorships is clear and America and Britain (read Roosevelt and Churchill) are united; that the peace to come must be the concern of everyone ("Open covenants openly arrived at" calls out Wilson's soul); that the domestic implications are the big ones; that only a better way of life assured in the Democracies even while the war goes on will beat the enemy. (NY Times 20/10/40) Speaking of England, he said: "A diet of great reforms here in wartime would do more to undermine the legend of the dictators than anything except military defeat; it is, indeed, a necessary psychological preparation for that, defeat."

"Evidence accumulates that this is the line the Churchill government is likely to follow this Winter. His colleagues see increasingly that victory for the morale of democracy is a prelude to victory in the field. The idea is even beginning to have a special vocabulary of its own. A revolution by consent is to be begun, and the fact that we have made our revolution by consent will entitle us to take the lead in that European revolution."

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Defeatism at home includes an appeal by the head of private school to sources of private wealth to support education more lavishly, so as to head off change. These appeals may be sincere, often enough, but they arise from ignorance just the same. The development of the klystron at the Westinghouse Bloomfield research laboratory (NY Times 19/10/40) to send electrical power through the air means that we have to face about the same social issue soon about the control of power as we failed to face about the control of radio. The American radio situation is a disgrace which will be repeated if we do not declare power as much a social instrument as the post office is. Let us make no mistake: we face an issue of the greatest magnitude. How are the users of privately broadcast power to be kept from tapping the broadcast without paying? It is possible that the great advance involved in the klystron will be delayed because of the private interests at stake. The British people own their broadcasting and it is peaceful and beautiful and bettering as a program. They license the ownership of sets. In the end this is cheaper for society and far better for children and youth in particular. Why do we not do the same?

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The social problems all come to a head simultaneously, naturally. Dr. H. L. Foss told the American College of Surgeons 22/10/40 that hundreds of major operations are being performed needlessly every day by inexperienced surgeons in the United States. This news seems to be a plea to close smaller hospitals, and maybe it will be used against doctors who do not like the American Medical Association. The answer to all such problems is socialised medicine. The great scourges continue to be met by extremely limited methods, mostly curative, not preventive. Infantile Paralysis is to be dealt with by mouse virus or monkey virus. (Time 21/10/40) In the present state of

society such wastage of time and money is quite natural and seems to us inevitable. But in a new order the first issues would be food, clothing, housing, good water supply, sanitation, leisure, enlightenment and freedom from worry, interesting and suitable work, proper exercise and enlivening sport, plenty of nature in sun and wind and the life of field and forest and stream, happy childhood and good education easily acquired. After that, prevention. It is of the highest likelihood that there would be a very little "after that" as to make the attitude of current medical men from Dr. Morris Fishbein down seem just quaint.

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Regulations have been drafted under the New York Coudert-McLaughlin law, which permits principals to release students from classrooms one hour a week for religious instruction at the request of parents. One can be in the fullest sympathy with religion in all aspects and yet feel sad about this, however well intended. What is really needed is to teach in so integrated an atmosphere that the existence of a supreme order is incontestably clear to the child and young person. If religion is made a fragment of learning, and so separated from life that special permission must be sought to teach it, then there is something very wrong with both the educational system and the religion thus compartmented. Under the regulations there is to be no announcement whatever in the schools relative to the program and no comment by any principal or teacher on the attendance or non-attendance of any pupil upon religious instruction. (HT 25/10/40). It all sounds very conspiratorial or worse, a little improper and clandestine. The fault lies far more with education than with churches. Doctrine and creed are the churches outright business. But education for life has steadily failed our children. They are entitled to integrated knowledge.

There is a movement toward unity perceivable in India, among Christians. Many Indian Christians believe that the Indian way of life is of very high worth, and that if Christianity is to flourish it must be on its own. In the United States the National Christian Mission has set out to reach thousands, as the National Preaching Mission did in 1936 (Time, 14/10/40), and has with it E. Stanley Jones, who has tried to bring back to America the ashrama of Indian life. Dean Luther A. Weagle of the Yale Divinity School has summed up the situation we have discussed above, and spoken words of wisdom for the National Mission. He takes the blame upon the churches and ministries to a degree MAIN CURRENTS cannot quite accept: We quote him October Yale Alumni Magazine:

"I do not attribute the rift between education and religion, between science and theology, to human perversity, but rather to human failure. And the failure that we of the churches ought to consider is not so much that of the educators as our own failure. We must have failed dismally in our attempt to portray the truth of God which claims us, if men and teachers of intellectual integrity have thus misunderstood us and are inclined to pass religion and theology by.

"Thou shalt love the Lord thy God with all thy mind."

This sharpens the issue to a clear focus. Integrated knowledge is needed (at Yale, too!), as MAIN CURRENTS advocates. After that is provided it will be much easier to accept the rest of the Law, "Thou shalt love thy neighbour as thyself". One's neighbor is one's self.

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Review in American Anthropologist, October-December, 1940 of the Work of the Gods in Tikopia (Polynesia) Raymond Firth - Monograph on Social Anthropology No. 1 of the London School of Economics and Political Science, Percy Lund, Humphries and Co., London, 1940. Reviewed by Edwin G. Burrows. Digest by B. L. W.

Says the reviewer: "Though Polynesia has long been prominent in the comparative study of religions this book offers data of a quality new to the area." The "Work of the Gods" is the name of a yearly cycle of rites based on myths whose character is indicated by this name. This ritual cycle is interwoven with every aspect of the culture of the island of Tikopia.

What significance has such a book as this in a non-technical and general educational sense? In the opinion of your MAIN CURRENTS commentator, just this: Too long has the public mind considered religion to be synonymous with priestcraft. Studies that show the actual functioning of a religion, not merely as a cult, but as an indissoluble part of the life of a people, a kind of social cement almost as essential and characteristic as a language, indeed a kind of cultural language, have then a prime educational value for world civilization, as eradicators of error and an illusion long cultivated by modern Western culture. For that culture has been gradually losing this social cement, and has attempted to make a virtue out of the loss. It has represented to itself the decay of that active, functioning religious element in the home life and public life as a process of emancipation from superstition and as the liberation from a priestly oppression.

Now this may be a little true, but only a little. Actually we are not heroic rebels defying powerful priests; we are drifting participants in a process of slow cultural change, the final result of which may be not a gain but a terrible loss. And this we have begun to realize. In almost any newspaper, writers, scientists, and scholars, tell us that the present chaos is the culmination of the destruction of faith.

Christianity was the cement of our culture. This may seem far afield from Firth's work on Polynesian religion; but such realizations are the necessary result of the impact of scientific comparative study of religion upon our ways of thinking.

The reactions of a dowser are considered to be due to supernormal sensitivity in the nerve muscles and other organs and he is particularly responsive to corpuscular emanations such as beta and cathode (electronic) rays. High frequency oscillatory effects are induced in the dowser's muscles by local Hertzian type electromagnetic fields and are shown by pendulum or bent twig movements. An almost perfect correlation exists between dowsing, ionization, Hertzian, magnetic and earth current phenomena of objects such as underground streams, pipe lines and electric cables. The depth and flow and yield of the field can also be determined within limits. In the discussion, its bearing on geophysical prospecting for minerals and oil was mentioned and possible lines of training dowsers for this work.

A. F. P. abstract from Science Abstracts, Science and the Divining Rod. C. Maby Jour. Royal So. Arts. 88, 525-39, April, 1940.

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In an experiment devised by the Goliot-Curies energy has been changed into matter (the materialization of energy). A photon of gamma radiation (non-material light having energy) was shot into lead, and was transformed into a positron and an electron. These are basic particles of matter, each having a mass or weight. It is now possible to change matter into energy and energy into matter. (Digest by B. L. W. from the Journal of Chemical Education, October, 1940 page 488, Article on 'Modern Chemical Concepts and the High-School Curriculum' - J. F. Castka

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A duck will sink in water to which has been added a small amount of Aerosol Ot (the di-octyl ester of sodium sulfo-succinate). So will powdered sulphur, cotton-wool, or string, which float on ordinary water. This is a spectacular demonstration of the fact that properties popularly thought to be an essential part of the matter involved are due to forces in the interspaces between the molecules of matter. In this case the forces are those that produce surface tension, and a suitable chemical will so alter these forces that the surface tension is reduced. This means that the water manifests a greater wetting or penetrating power, and no longer "glides off the duck's back" but immediately soaks the feathers or the other porous substances, which then behave like "water-logged" wood or a perforated tin can. B. L. W. from Journal of Chemical Education, page 468 'Notes on the Demonstration of "Wetter" Water' - C. R. Caryl)

Now that the famed Circle Linguistique de Prague has been crushed by the war, what may well be the world's only class in General Descriptive Phonology - the science of how sounds are made and put together in languages - has just been started at Yale, under the eminent American phonetician Trager. The researches at Yale underlying this course not only enable one to pronounce the most difficult sounds of aboriginal tongues and to reduce them to writing, but have shown, and the course will teach, how these sounds form in every language a system of order and symmetry and prosodic rhythm --how, in short, language geometrizes. It might be called the mathematics of language. One great obstacle to human brotherhood has been the belief that the other fellow's language is mere "gibberish". The revelation of scientific beauty in place or "gibberish" may be a large step toward brotherhood. B. L. W.

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The Association for Symbolic Logic (now five years old) heard its President, Dr. Haskell B. Curry, of Pennsylvania State College, on the nature of proof. He held that no statement of what constitutes proof in mathematics has yet been formulated. The account (NY Times, 27/10/40) brings up the dilemma "that the number of points in a line an inch long is equal to the number of points in the entire universe. Again we play with definitions. What is a point?"

MAIN CURRENTS would like to offer, for this particular problem, a solution available from Indian philosophical sources. The point is zero, in that outlook. In the West it is sometimes something and can be laid down in rows to make lines, and sometimes it is nothing except position in motion. This ambiguity vitiates much of western thinking. Yet the modern physical sciences show very clearly that lines of force are not atoms, and that atoms are nothing; in Schrödinger's wonderful phrase: "a hole with an aura around it."

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Dr. W. F. G. Swann, at the National Academy of Sciences, came very close to the Indian idea in his address on October 29th (Herald Tribune):

"The atom is hindered in its activities by concepts such as electronic charge and electronic mass, which are entirely man-made and which were imposed on the atom by scientists in their efforts to understand natural phenomena.

"Under the Swann theory the atom would be stripped of all limitations of a material nature and reduced, or elevated, to something akin to a centralized focal point of activity in which complete freedom would be granted to the atom to have anything it wishes happen and to have these events occur within the atom in any manner the atom sees fit, only the outer results being important."

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"On Sunday, February 25th, there appeared in the New York Herald Tribune an editorial headed "The Sky Parade." It described from an astronomer's point of view the beauty of the unusual phenomenon at that time appearing in the western evening sky, when the five planets visible to the naked eye were all in one sector of the heavens. The writer of the editorial took advantage of an opportunity to disparage astrology at the same time, stating it to be fortunate that the future is closed to us, and that reading the positions and natures of celestial bodies was useless. Just five weeks later the same newspaper devoted a full page of its rotogravure section to the work of Dr. Harlan True Stetson, illustrating it with charts and graphs, to show that by keeping tabs on sun spots it is possible to foretell the future trends in economics. It is generally agreed (in fact some scientists state the connection is inescapable) that the revolution of the planet Jupiter times the recurring intensity of sun spot activity. So here we have the New York Herald Tribune denouncing astrology on the one hand and then agreeing on the other that it is possible by studying celestial bodies to predict the future!" (Astrology Guide October, 1940 Page 29)